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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/582,147	06/07/2006	Yoshihiro Akechi	JFE-06-1122	8833

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EXAMINER	
LEE, LESLIE A	
ART UNIT	PAPER NUMBER
4184	
MAIL DATE	DELIVERY MODE
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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/582,147	AKECHI ET AL.	
	Examiner	Art Unit	
	LESLIE A. LEE	4184	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *07 June 2005*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *35-40* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *35-40* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *07 June 2006* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date *6/7/2006*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Claim Rejections - 35 USC § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

2. Claim 35 is rejected under 35 U.S.C. 103(a) as being unpatentable over Forster et al. (US Patent Application Publication No. 2004/0025598).

a. Forster et al. teaches: A sensor (sensor 18, fig 2c) disposed directly associated with a device fed by a feed pipe (orifice 20, fig 2c), for monitoring the feed state by detecting the supply to the device, the sensor comprising a detector insertion portion (paddle structure 22, fig 2c) extending substantially vertically from a middle portion of the passage, into which a detector (piezo-resistive Wheatstone bridge 24, fig 2c) is inserted; wherein the detector is disposed such that a first end portion of the detector is fixed to a top portion of the detector insertion portion, and a second end portion is positioned in the passage without restraint, the detector undergoing bending deflection by displacement of the second end portion due to the flow, and the detector having a piezoelectric element (piezo-resistive Wheatstone bridge 24, fig 2c) that generates voltage by the bending deflection.

b. Forster et al. does not teach: A lubricant-feed-state monitoring sensor disposed directly associated with a device fed with oily or fatty lubricant or a lubricant feed pipe for feeding lubricant to the device, the sensor comprising a T-shaped

member having a lubricant passage connected to the lubricant feed pipe and a detector insertion portion extending substantially vertically from a middle portion of the lubricant passage.

i. The structure of the sensor cited in Forster et al. is capable of performing the intended function of the sensor in claim 35. The sensor cited in Forster, is intended to measure flow of liquid and is capable of being inserted and deflected by lubricant flow. It would have been obvious to one of ordinary skill in the art to apply this sensor to the lubrication feed pipe of claim 35 because Forster et al. states that this flow sensor reduces space requirements, external tubing, connectors fittings, and cost of installation and maintenance (page 5, paragraph 81).

ii. Forster et al. discloses a sensor integrally disposed within the feed piping (fig 4b). It would have been obvious to one of ordinary skill in the art to modify the sensor cited Forster et al. with a T-shaped member since it has been held that making a formerly integral structure portable or movable involves only routine skill in the art.

3. Claim 36 is rejected under 35 U.S.C. 103(a) as being unpatentable over Forster et al. (US Patent Application Publication No. 2004/0025598) as applied to claim 35 above, and further in view of Wiktor (US Patent No. 6,232,129).

c. Forster et al. does not teach: wherein the detector further comprises a heat shrinkable film made of a flexible material that coats the piezoelectric element.

iii. Wiktor teaches a heat shrink tubing surrounding a piezoelectric element.

iv. It would have been obvious to one of ordinary skill in the art to combine the heat shrink tubing cited in Wiktor with the piezoelectric film of Forster et al. because Wiktor states that the heat shrink tubing provides mechanical protection and electrical insulation for the piezoelectric element (column 5, lines 7-9).

4. Claims 37-40 are rejected under 35 U.S.C. 103(a) as being unpatentable over Forster et al. (US Patent Application Publication No. 2004/0025598) and further in view of Rafei (US Patent Application Publication No. 2004/0255656).

d. Re claim 37, Forster et al. teaches: A method of monitoring a feed state to a device fed with a sensor (sensor 18, fig 2c) mounted to the device or a feed pipe connected to the device comprising: disposing the sensor to undergo bending deflection by flow ("fluid to be measured is directed through the orifice in the flow sensor", page 3 paragraph 52); converting strain generated by the sensor due to the bending deflection to an electrical signal ("creates a change in voltage", page 3 paragraph 52);

v. Forster et al. does not teach: measuring peak voltage of the electrical signal by peak hold processing; and when the peak voltage is in a predetermined range, determining that the feed state is abnormal.

vi. Rafei teaches monitor circuit (15, fig 1) which produces an alarm or shut down signal (136, fig 6a) when lubrication conditions based on a flow signal (22, fig 6a) from a flow monitor (20, fig 6a) and other condition signals falls outside acceptable operation parameters.

(1) It would have been obvious to one of ordinary skill in the art to apply the flow sensor cited in Forster et al. to the monitor circuit system cited in Rafei because the flow sensor cited in Forster et al. is an equivalent with the flow monitor cited in Rafei.

vii. Forster et al. does not teach this method applied to a lubrication system.

(2) It would have been obvious to one of ordinary skill in the art to apply the signal processing and alarm method disclosed in Forster et al. to a lubrication system because the flow sensor cited in Forster et al. is capable of being applied to any type of flow system and Forster et al. states that this flow sensor reduces space requirements, external tubing, connectors fittings, and cost of installation and maintenance (page 5, paragraph 81).

e. Re claim 38, Forster et al. does not teach: wherein a lower threshold and an upper threshold are set for the peak voltage in advance; and when the peak voltage falls below the lower threshold, determining that the amount of lubricant has decreased or stopped, and when the peak voltage exceeds the upper threshold, determining that the part downstream from the sensor is clogged.

viii. Rafei teaches monitor circuit (15, fig 1) which produces an alarm or shut down signal (136, fig 6a) when lubrication conditions based on a flow signal (22, fig 6a) from a flow monitor (20, fig 6a) and other condition signals falls outside acceptable operation parameters.

(3) It would have been obvious to one of ordinary skill in the art to apply the flow sensor cited in Forster et al. to the monitor circuit system cited in Rafei because the flow sensor cited in Forster et al. is an equivalent with the flow monitor cited in Rafei.

f. Re claim 39, Forster et al. as modified by Rafei teaches: wherein, when the sensor is a piezoelectric element (piezo-resistive Wheatstone bridge 24, fig 2c of Forster et al.), capacitance of the sensor is measured after monitoring of the lubricant feed state has been started and when the capacitance of the sensor is less than a predetermined threshold, determining that the sensor is abnormal (alarm signal 136, fig 6a of Rafei).

ix. Forster et al. as modified by Rafei does not teach: and abnormality due to the abnormal sensor is removed from the determination on abnormality of feed state of lubricant based on the peak voltage, on the basis of the determination on the sensor abnormality.

x. It would have been obvious to one of ordinary skill in the art to remove the abnormality due to the alarm signal cited in Rafei because it is inherent in the purpose of an alarm to address or remove the cause of the alarm.

g. Re claim 40, Forster et al. as modified by Rafei teaches: wherein, when the sensor is a piezoelectric element (piezo-resistive Wheatstone bridge 24, fig 2c of Forster et al.), capacitance of the sensor is measured after monitoring of the lubricant feed state has been started and when the capacitance of the sensor is less than a

predetermined threshold, determining that the sensor is abnormal (alarm signal 136, fig 6a of Rafei).

xi. Forster et al. as modified by Rafei does not teach: and abnormality due to the abnormal sensor is removed from the determination on abnormality of feed state of lubricant based on the peak voltage, on the basis of the determination on the sensor abnormality.

xii. It would have been obvious to one of ordinary skill in the art to remove the abnormality due to the alarm signal cited in Forster et al. because it is inherent in the purpose of an alarm to address or remove the cause of the alarm.

Conclusion

5. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Shachar et al. (US Patent No. 7,313,973) teaches a flow sensor with a deflecting piezoelectric element disposed in the flow piping which generates an alarm signal when full flow or leakage flow is detected. Samuelson et al. (US Patent No. 6,253,625) teaches a stalk with strain gauges installed on it to be disposed in the flow of piping. Cewers et al. (US Patent No 6,345,540) teaches a flow meter with integral flexible tines with piezo-resistive elements installed on them to be deflected in the direction of fluid flow, and a monitor operably connected to the tines which monitors changes in flow.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to LESLIE A. LEE whose telephone number is (571)270-5927. The

examiner can normally be reached on Monday - Thursday 7:30 - 5, Friday 7:30-4, with alternate Fridays off.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Jared Fureman can be reached on (571)272-2391. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/L. A. L./
Examiner, Art Unit 4184

/ISAM ALSOMIRI/
Primary Examiner, Art Unit 3662